Amendments to the Claims

The Claim Listing below replaces all prior versions of the claims in the subject application.

Claim Listing:

1.   (Currently Amended) An apparatus, comprising:

an integrated circuit (IC) ~~configured~~ to receive an input/output (I/O) request to write data stored on at least one target device comprised in at least one local storage array and generate one or more I/O transactions ~~configured~~ to write data on at least one target device comprised in at least one remote storage array, said IC further <u>storing in the IC</u> ~~comprising~~ a counter ~~configured to include at least one bit~~ <u>including a plurality of bits</u> corresponding to <u>a plurality of data blocks</u> ~~at least one data block~~ transmitted during said one or more I/O transactions if said ~~at least one data block was~~ <u>plurality of data blocks were</u> not successfully written to said at least one remote storage array, the counter further ~~configured~~ to clear said <u>plurality of bits</u> ~~at least one bit~~ if said data blocks <u>are</u> ~~is~~ successfully written to said at least one <u>remote</u> storage array<u>, said IC also to generate and store in said at least one local storage array, if the at least one remote storage array is inoperative during said one or more I/O transactions, a bitmap image representing data that is to be written to said at least one remote storage array</u>.

2.   (Original) The apparatus of claim 1, wherein:

said integrated circuit is further capable of generating one or more I/O transactions capable of writing data stored on said at least one target device comprised in said at least one local storage array.

3.   (Original) The apparatus of claim 1, wherein:

said local storage array and said remote storage array each comprise a redundant array of inexpensive disks (RAID) each comprising RAID Level 1 storage arrays.

4.   (Original) The apparatus of claim 3, wherein:

said one or more I/O transactions capable of writing data on at least one target device comprised in at least one remote storage array comprises a transaction to mirror data on said RAID Level 1 storage array in response to said I/O request to write data stored on at least one target device comprised in at least one local storage array.

5.   (Original) The apparatus of claim 1, wherein:

said local storage array and said remote storage array each comprise a redundant array of inexpensive disks (RAID) each comprising at least one of RAID Level 0, RAID Level 10 and RAID Level 1E storage arrays.

6.   (Original) The apparatus of claim 5, wherein:

said one or more I/O transactions capable of writing data on at least one target device comprised in at least one remote storage array comprises a transaction to stripe data on at least one of said RAID Level 0, RAID Level 10 and RAID Level 1E storage arrays in response to said I/O request to write data stored on at least one target device comprised in at least one local storage array.

7.   (Original) The apparatus of claim 1, wherein:

said integrated circuit further capable of receiving an input/output (I/O) request to read data on at least one target device comprised in at least one local storage array, said integrated circuit further capable of generating one or more I/O transactions

capable of reading data on at least one target device comprised in at least one remote storage array.

8.   (Currently Amended) A method, comprising:

receiving an input/output (I/O) request to write data stored on at least one target device comprised in at least one local storage array;

generating one or more I/O transactions ~~configured~~ to write data on at least one target device comprised in at least one remote storage array;

storing in a circuit card and incrementing a counter including a plurality of bits ~~incrementing at least one bit~~ corresponding to a plurality of data blocks ~~at least one data block~~ transmitted during said one or more I/O transactions if said plurality of data blocks were ~~at least one data block was~~ not successfully written to said at least one remote storage array; ~~and~~

clearing said plurality of bits ~~at least one bit~~ of said counter if said data blocks are ~~is~~ successfully written to said at least one remote storage array; and

generating and storing in said at least one local storage array, if the at least one remote storage array is inoperative during said one or more I/O transactions, a bitmap image representing data that is to be written to said at least one remote storage array.

9.   (Original) The method of claim 8, further comprising:

generating at least one of said I/O transactions to mirror data on said local storage array and said remote storage array.

10.   (Original) The method of claim 8, further comprising:

generating at least one of said I/O transactions to stripe data on said local storage array and said remote storage array.

11.   (Original) The method of claim 8, further comprising:

receiving an I/O request to read data on said at least one target device comprised in said at least one local storage array; and

generating one or more I/O transactions capable of reading data on said at least one target device comprised in said at least one remote storage array.

12.   (Original) The method of claim 11, further comprising:

determining the status of said remote storage array, and, if said remote storage array is incapable of transmitting data in response to said one or more I/O transactions, regenerating said one or more I/O transactions to read data to said remote storage array at one or more preselected times.

13.   (Original) The method of claim 12, further comprising:

storing information based on data unread from said remote storage array on said local storage array, and, retrieving said information based on data unread from said local storage array.

14.   (Original) The method of claim 8, further comprising:

determining the status of said remote storage array, and, if said remote storage array is incapable of receiving data, regenerating said one or more I/O transactions to write data on said remote storage array at one or more preselected times.

15.   (Original) The method of claim 14, further comprising:

storing information on said local storage array based on unwritten data related to said I/O transactions to write data to said remote storage array, and, retrieving said information based on unwritten data from said local storage array and writing said unwritten data to said remote storage array.

16.   (Original) The method of claim 11, further comprising:

copying data from said at least one target device comprised in said at least one remote storage array to said at least one target device comprised in said local storage array.

17.   (Currently Amended) A system, comprising:

a circuit card comprising an integrated circuit (IC) ~~configured~~ to communicate in accordance with a plurality of different communication protocols, the circuit card ~~configured~~ to be coupled to a bus, and said IC further ~~configured~~ to receive an input/output (I/O) request to write data stored on at least one target device comprised in at least one local storage array, said IC further ~~configured~~ to generate one or more I/O transactions ~~configured~~ to write data on at least one target device comprised in at least one remote storage array wherein said IC further <u>stores in said IC</u> ~~comprises~~ a counter <u>including a plurality of bits</u> ~~configured to include at least one bit~~ corresponding to <u>a</u> <u>plurality of data blocks</u> ~~at least one data block~~ transmitted during said one or more I/O transactions if said <u>plurality of data blocks were</u> ~~at least one data block was~~ not successfully written to said at least one remote storage array, the counter further ~~configured~~ to clear said <u>plurality of bits</u> ~~at least one bit~~ if said data block<u>s are</u> ~~is~~ successfully written to said at least one storage array<u>, said IC also to generate and store</u> <u>in said at least one local storage array, if the at least one remote storage array is</u> <u>inoperative during said one or more I/O transactions, a bitmap image representing data</u> <u>that is to be written to said at least one remote storage array</u>.

18.   (Original) The system of claim 17, wherein:

said integrated circuit is further capable of generating one or more I/O transactions capable of writing data stored on said at least one target device comprised in said at least one local storage array.

19.   (Original) The system of claim 17, wherein:

said local storage array and said remote storage array each comprise a redundant array of inexpensive disks (RAID) each comprising RAID Level 1 storage arrays.

20.   (Original) The system of claim 19, wherein:

said one or more I/O transactions capable of writing data on at least one target device comprised in at least one remote storage array comprises a transaction to mirror data on said RAID Level 1 storage array in response to said I/O request to write data stored on at least one target device comprised in at least one local storage array.

21.   (Original) The system of claim 17, wherein:

said local storage array and said remote storage array each comprise a redundant array of inexpensive disks (RAID) each comprising at least one of RAID Level 0, RAID Level 10 and RAID Level 1E storage arrays.

22.   (Original) The system of claim 21, wherein:

said one or more I/O transactions capable of writing data on at least one target device comprised in at least one remote storage array comprises a transaction to stripe data on at least one of said RAID Level 0, RAID Level 10 and RAID Level 1E storage arrays in response to said I/O request to write data stored on at least one target device comprised in at least one local storage array.

23.   (Original) The system of claim 17, wherein:

said integrated circuit further capable of receiving an input/output (I/O) request to read data on at least one target device comprised in at least one local storage array, said integrated circuit further capable of generating one or more I/O transactions

capable of reading data on at least one target device comprised in at least one remote storage array.

24.   (Currently Amended) An article comprising:

a storage medium having stored thereon instructions that when executed by a machine result in the following operations:

receiving an input/output (I/O) request to write data stored on at least one target device comprised in at least one local storage array;

generating one or more I/O transactions ~~configured~~ to write data on at least one target device comprised in at least one remote storage array;

storing in a controller and incrementing a counter including a plurality of bits ~~incrementing at least one bit~~ corresponding to a plurality of data blocks ~~at least one data block~~ transmitted during said one or more I/O transactions if said plurality of data blocks were ~~at least one data block was~~ not successfully written to said at least one remote storage array; ~~and~~

clearing said plurality of bits ~~at least one bit~~ of said counter if said data blocks are ~~is~~ successfully written to said at least one storage array;

generating and storing in said at least one local storage array, if the at least one remote storage array is inoperative during said one or more I/O transactions, a bitmap image representing data that is to be written to said at least one remote storage array.

25.   (currently amended) The article of claim 24, wherein said instructions ~~that~~ when executed by said machine result in the following additional operations:

generating at least one of said I/O transactions to mirror data on said local storage array and said remote storage array.

26.   (Original) The article of claim 24, wherein said instructions that when executed by said machine result in the following additional operations:

generating at least one of said I/O transactions to stripe data on said local storage array and said remote storage array.

27.   (Original) The article of claim 24, wherein said instructions that when executed by said machine result in the following additional operations:

receiving an I/O request to read data on said at least one target device comprised in said at least one local storage array; and

generating one or more I/O transactions capable of reading data on said at least one target device comprised in said at least one remote storage array.

28.   (Original) The article of claim 27, wherein said instructions that when executed by said machine result in the following additional operations:

determining the status of said remote storage array, and, if said remote storage array is incapable of transmitting data in response to said one or more I/O transactions, regenerating said one or more I/O transactions to read data to said remote storage array at one or more preselected times.

29.   (Original) The article of claim 28, wherein said instructions that when executed by said machine result in the following additional operations:

storing information based on data unread from said remote storage array on said local storage array, and, retrieving said information based on data unread from said local storage array.

30.   (Original) The article of claim 24, wherein said instructions that when executed by said machine result in the following additional operations:

determining the status of said remote storage array, and, if said remote storage array is incapable of receiving data, regenerating said one or more I/O transactions to write data on said remote storage array at one or more preselected times.

31.   (Original) The article of claim 30, wherein said instructions that when executed by said machine result in the following additional operations:

storing information on said local storage array based on unwritten data related to said I/O transactions to write data to said remote storage array, and, retrieving said information based on unwritten data from said local storage array and writing said unwritten data to said remote storage array.